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Repetitive zinc-binding domains in the protein transcription factor IIIA from Xenopus oocytes

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The 7S particle of *Xenopus laevis* oocytes contains 5S RNA and a 40-K protein which is required for 5S RNA transcription in vitro. Proteolytic digestion of the protein in the particle yields periodic intermediates spaced at 3-K intervals and a limit digest containing 3-K fragments. The native particle is shown to contain 7-11 zinc atoms. These data suggest that the protein contains repetitive zinc-binding domains. Analysis of the amino acid sequence reveals nine tandem similar units, each consisting of approximately 30 residues and containing two invariant pairs of cysteines and histidines, the most common ligands for zinc. The linear arrangement of these repeated, independently folding domains, each centred on a zinc ion, comprises the major part of the protein. Such a structure explains how this small protein can bind to the long internal control region of the 5S RNA gene, and stay bound during the passage of an RNA polymerase molecule.

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